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(54) **Method and apparatus for restricting credit card communication calls**

Verfahren und Anordnung zur Einschränkung von Kreditkartenkommunikationsanrufen

Méthode et dispositif pour limiter les appels de communication par carte de crédit

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Chip-Karte - Multifunktionskarte der Zukunft'

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D scription

T chnical Field

This invention relates to the charging and billing of communication calls and, more particularly, to an automated method of validating a request to charge a call using a credit card.

Background of the Invention

Credit card billing is supplementing and gradually replacing the use of cash as the preferred method for the payment of goods and services. The use of credit cards for the payment of telecommunication services also is increasing and, in some situations such as calls from pay telephones, is the preferred method of paying for calls.

To better manage the increasing use of credit cards to bill telecommunication services, telephone companies have incorporated data base systems to provide automated billing of calls or to assist the operator in the billing of calls. One such arrangement is described in A. B. Mearns U. S. Patent No. 4,162,377. In Mearns, a method of automatically processing special service calls (such as credit card, collect and charge-to-a-third number calls) is disclosed which verifies the entitlement of a caller to charge and bill the call to a number other than that of the station from which the call is originated. The method, referred to as ABC (Auto Bill Calling), furnishes automated collected calling and unrestricted calling on credit card and charge-to-a-third number calls.

Businesses have found it desirable to provide their employees with credit cards for charging telephone calls during business trips. However, businesses do not want to pay for non-business related calls of the employee. Businesses would like a cost-effective way to restrict certain types of credit card calls.

One prior AT&T service uses a "call me" card which prevents a caller from using a telephone charge card to bill a call to other than the telephone number on the telephone charge card. The above-identified Mearns patent also discloses a method for assisting operators in preventing collect calls and bill-to-a-third number calls from being billed to pay telephone stations within a designated area.

Notwithstanding these important prior art arrangements, there is an increasing need to provide businesses and other owners of credit cards with a more flexible way to restrict the use of their credit cards for billing communications calls.

EP-A-O 239 503 discloses a telephone call supervision arrangement for use with a private PABX system. Each telephone station connects to the PABX via a reading and validation circuit. The circuit includes a card reader for reading the user's identification card. The identification card data is used to access a remotely located authorized communication table. When the user

enters the dialed number, it is compared to the authorized communication table entries to validate whether the call should be connected

GB-A 2 086 187 describes a call-restriction arrangement in which each user has his/her own identification code. When a correct ID code is entered, the call-restriction feature is disabled. If no ID code is entered, then the call-restriction feature remains enabled. This arrangement is designed for implementation within a telephone station set.

According to the present invention, there is provided a method as defined in claim 1 or the apparatus as defined in claim 13.

In accordance with the present invention, apparatus and method are disclosed for limiting the geographical calling area of calls charged to a credit card. The present invention is implemented as part of, and hereinafter referred to as, a Customer Account Services (CAS) system. The inventive CAS system is directed to a calling charge validation method for processing a call placed over the public switched network which includes a call billing request 201 and a call dialing sequence (called number) 103. After acknowledging the receipt of the billing request to the caller, a billing code is received from the caller. The charge validation location 110 then receives a message including the call billing code and the called number and then validates the billing code. For a validated billing code, a centralized data base is accessed using the billing code to obtain stored dialing data which identifies potential calling destinations. The called number is then compared with the stored dialing data and, in response thereto, the switched network is signaled to control a call connection to the called destination. If the called number is to a geographically restricted area or number, a call denial response is sent from the network, via the LEC, to the caller. Calls can also be restricted based on the calling party number. As in the prior art, a call denial response is also given to the caller if the credit card is invalid for billing calls. The present invention provides businesses and other owners of credit cards with a more flexible way to restrict the use of their credit cards for billing calls.

Brief Description of the Drawing

FIG. 1 shows, in block diagram form, an illustrative network configuration of Local Exchange Carriers (LEC), toll switching offices, a Common Channel Signaling (CCS) Network, Traffic Service Position System (TSPS) or Operator Services Position System (OSPS) equipment, Network Control Point (NCP) and Operations Support Systems (OSS) for providing credit card calls and useful in describing the operations of the CAS system;

FIG. 2 shows a flow diagram of functions performed by the GAS system and other network elements of FIG. 1 in providing credit card calls in accordance with the operation of the present invention and

FIG. 3 illustrates a contract table, a customer defined geographic restriction table and an invalid calling station table used with the GAS system

Detailed Description

Before proceeding with the operating description of the inventive CAS system, it should be recognized that the method of the CAS system may be adapted for use with a variety of different systems which can be arranged to implement the switching network configuration shown in FIG. 1. Since the various systems shown in FIG. 1 utilize a variety of hardware and programming techniques, no attempt is made to describe the existing programs used to control these various systems. However, using the following description as a guide, the operations of the CAS system must be integrated into the control structure of the various systems of FIG. 1, and tailored to cooperate with other features and operations of those systems. Thus, in order to avoid confusion and enable those skilled in the art to practice the claimed invention, this specification will describe the operation of the CAS system using the network block diagram of FIG. 1, the flowchart of FIG. 2 and the various tables shown in FIG. 3 which, together, are used to describe operating steps and the various data required to implement the CAS system. In the following description, the first digit of an element's reference number designates the figure where the element is located (e.g., 101 is located in FIG. 1).

With reference to FIG. 1, there is illustrated a block diagram of a well-known network configuration useful in describing the operation of the CAS system. The drawing illustrates two Local Exchange Carrier (LEC) switching offices 101 and 102, which serve associated telephone stations. The LEC 101 serves stations 103, 104; LEC 102 serves stations 105, 106. The drawing also discloses a Traffic Service Position System (TSPS) or Operator Services Position System (OSPS) 113 and toll offices 107 and 108 which, together, form a toll telephone network serving LEC's 101 and 102. The structural details of the LEC, toll offices, and the TSPS/OSPS system form no part of the present invention and are only described herein to the extent necessary for an understanding of the CAS system. For accuracy, it should be noted that the TSPS cannot send the calling party number in the CAS validation query shown on facility 123 of FIG. 1. For convenience, OSPS/TSPS 113 will be referred to hereinafter as OSPS 113.

A TSPS for serving credit card calls is disclosed in U. S. Patent No. 3,484,560 issued to R. J. Jaeger, Jr., on Dec. 16, 1969, and the December, 1970, article in Bell System Technical Journal, 49, BSTJ No. 10, page 2417, et seq., which describes the structure and operations of TSPS equipment.

An illustrative OSPS is described in the article written by N. X. DeLessio, et al.: "An Integrated Operator Services Capability for the 5ESS Switching System", International Switching Symposium '84, (Florence), Session 22C, Paper 3, pp. 1-5, May, 1984.

Each of the LEC's, by way of example, is suitably an electronic program-controlled telephon system of the No. 1 ESS (Electronic Switching System) or No. 5 ESS type. The No. 1 ESS is described in the Bell System Technical Journal (BSTJ), September, 1964, Volume XLIII, Number 5, Parts 1 and 2; and in the R. W. Downing, et al., U. S. Pat. No. 3,570,008 of Mar. 9, 1971. The No. 5 ESS is extensively described in AT&T Technical Journal, vol. 64, no. 6, part 2, pp. 1305-1564, July/August, 1985. The above-identified disclosures and the citations referred to therein may be consulted for a complete understanding of the construction and operations of a typical LEC office.

Each toll office, 107 and 108, may be, illustratively, an electronic program-controlled telephone system of the No. 4 ESS design with Common Channel Signaling (CCS or CCIS), as disclosed in the Bell System Technical Journal (BSTJ), September, 1977, Volume 56, No. 7. The CCS direct signaling facilities utilized and the data base system are basically a data link, or packet, switching system for routing messages in accordance with their address data contents. CCS system features are disclosed in the February, 1978, Bell System Technical Journal (BSTJ) No. 2 and in W. B. Smith, et al., U. S. Pat. No. 3,624,613 of Nov. 30, 1971.

An NCP is a centralized data base facility which is controlled by a processor 131 comprising CPU 132 and memory 133. The memory stores a system of programs 134 to establish, edit and manage information stored in its data memory 135. The program memory 134 includes and utilizes the special program steps outlined in the flow charts of FIG. 2 and the data of table 1 of FIG. 3 for implementing CAS. By way of example, NCP may comprise an AT&T Company 3B20D processor equipped with disk storage. A receiver 136 of NCP receives dual tone multi-frequency (DTMF) signals and other signals from facility link 123. A transmitter circuit 137 is included for signaling DTMF messages from NCP over link 123 to control the switching network.

The operation of Network Control Point (NCP) is described, for example, in the D. Sheinbein, et al., article on pp. 1737-1744 of Bell System Technical Journal (BSTJ), September, 1982, Volume 61, No. 7, part 3. The changes in the operation of NCP to perform the disclosed CAS/NCP 110 features is described in later paragraphs.

The operations of an Operations Support System (OSS) is generally described in Bell System Information and Operations Systems, March, 1980, Issue 4. The changes in the operations of OSS to perform the described CAS/OSS 111 features is described in later paragraphs.

In the following description, we assume that a credit card call is handled without the intervention of an operator. An operator-assisted call will be described in a later paragraph. With reference to FIGs. 1-3, the automatic

processing of a credit card call with the CAS system is described by assuming that the call is originated at calling station 103 in Chicago and has, as a destination, station 105 in New York. Such a call involves the dialing of an initial zero plus ten digits (e.g., 0+NPA-NXX-XXXX) including an area code NPA number followed by seven digits NXX-XXXX identifying the called station. The "N" digit is any numbers 2-9 and each of the "X" digits is any number 0-9.

In step 201, a caller at station 103 initiates a call, dials the zero, the area code digits and the called station number. For example, assume the called party at station 105 has the telephone number 212-221-0105. Office LEC 101, illustratively, routes the call to the toll telephone network over a trunk 121 to an OSPS system 113 equipped with CCS facilities. In step 202, the OSPS System 113 sends an alerting or prompting signal, for example, a "bong" tone or a tone and machine announcement for prompting the caller to dial the appropriate credit number for billing purposes.

In step 203, for credit card calls from station 103 to any called station number, such as station 105, the caller responds to the prompting signal by dialing the credit card number (i.e., a billing code). The credit card number may be, illustratively, a CCITT International Standard telephone credit card number plus a four-digit PIN (Personal Identification Number) code, (YYYY). Each of the "Y" digits comprises any value 0-9. If necessary, OSPS 113 reminds the caller to enter the PIN code.

The caller's business telephone is, illustratively, station 104 in Chicago. The caller's business telephone includes, for example, an area code, 312, plus a seven digit number, 366-4576.

In accordance with an aspect of the invention, the credit card may also be implemented using a standard telephone credit card or any well-known commercial credit card. The use of a commercial credit card number for billing purposes has the advantage that it does not change when a customer changes his or her telephone number.

In step 204, the OSPS 113 checks if a contract table restriction exists for the particular credit card being used. The contract table 310 may, for example, indicate if the particular credit card can be used to bill calls handled by that LEC 101. The contract table information 311 for the LEC's may be defined in terms of which NPA-NXX's do not have billing agreements with this common carrier. In our example, since no contract table entry has previously been entered for LEC 101 (i.e., the NPA-NXX (312-366) part of the caller's telephone credit card number is not found on contract table 311) no contract table restriction exists and call processing can continue. If a contract table restriction exists, (e.g., a call from a station served by an LEC having an NPA-NXX of 312-365), an appropriate call denied message is announced, in step 226, to the caller and the call is terminated.

The OSPS 113 checks certain fraud criteria associated with the call. One fraud condition, the "all PIN's fail" condition shown in step 205, exists when repeated call attempts using a particular credit card give different wrong PIN codes. A fraud threshold is established to permit a certain number of misdialled PIN codes. If the fraud threshold is not exceeded, in step 205, then call processing continues. When a certain fraud threshold is exceeded in step 205, this indicates that either the caller forgot the PIN number (no fraud) or that that caller does not know the PIN number because it is not his or her credit card (fraud). Under these circumstances, the card number is deactivated at OSPS 113 for a given period of time. Thereafter, in step 218, an appropriate announcement is played to the calling party.

In step 206, the OSPS 113 inserts the credit card number in the address field of the CAS validation query. The CCS network then performs translation on the credit card number in the address field to determine which CAS/NCP location has the customer record for that credit card number. In our example OSPS 113 determines that a CAS validation query is to be routed to CAS/NCP 110 for checking the validation of the call. The OSPS 113 formulates a credit card validation query including the credit card number, PIN, called number and calling number. In step 207, the CAS validation is formatted into a standard CCS direct signaling message format and routed via link 122, CCS network 109, and link 123 to CAS/NCP 110.

In steps 208 through 216, CAS/NCP 110 performs several checks or comparisons to determine whether a dialed call, which is to be charged to a credit card number, should be permitted or denied. In step 208, the CAS/NCP 110 checks the validity of the credit card number in a well-known manner. If the credit card is invalid, CAS/NCP 110 generates a call denied message in step 217 which is sent via link 123, CCS network 109, and link 122 to OSPS 113. In step 218, OSPS 113 generates a call denied announcement which is sent via trunk 121 and LEC 101 to the caller's station 103. The caller may be asked to enter the card number again or to hang up depending on the number of attempts by the caller. Additionally, alternative billing means may also be requested from the caller.

If the credit card is valid, the PIN number is checked in step 209. If the PIN number is invalid, a call denied message is generated, in step 217, as previously described. If a valid PIN number is received, the geographic restriction table for the customer is checked in step 210.

Each customer handled by CAS/NCP 110 has a Geographic Restriction (GR) table 320 as shown in FIG. 3. Optionally, as illustrated, a separate GR table 320 may exist for each valid PIN number 322 associated with the customer credit card number 321. The customer specifies any domestic or international geographic restrictions which are entered in GR table 320. If a domestic restriction is established, the GR bit 323 is set and, if an

international restriction is established the GR bit 324 is set. The CAS/NCP 110 uses the called number to determine whether the call is domestic or international. In our domestic call example, the processor 131 of CAS/NCP 110 assesses GR table 320, in step 210, to determine if the customer's account has established any domestic geographic restriction, i.e., is GR bit 323 set. If GR bit 323 is not set, all domestic calls can be billed to that credit card number (subject to restrictions enforced for reasons other than customer-defined geographic dialing restrictions.) One such restriction is fraud which is checked in step 216 as described in a latter paragraph.

If a GR bit 323 is set, then CAS/NCP 110 compares the called number against the restricted areas or numbers in the domestic field 321 of GR table 320. In step 211, a polarity bit 333 of domestic field 321 of table 320 is checked. If the polarity bit 333 is set, the list of numbers in the domestic field 331 of GR table 320 is considered inclusive. If the polarity bit 333 is not set, the list of numbers in domestic field 331 is considered exclusive. The terms "inclusive" and "exclusive" will be defined in a later paragraph.

GR table 320 may be implemented as shown in FIG. 3 to include a domestic restriction field 331 and an international restriction field 332. These fields may also be implemented to include multiple levels. Domestic field 331 is shown, illustratively, to include up to three levels for each domestic dialing sequence (e.g., called number). International field 332 is shown, illustratively, to include up to two levels for each foreign dialing sequence. It should be noted that the illustrative arrangement of GR table 320 may be adapted to best suit the restriction requirement needs of particular customers.

In GR table 320, the restrictions specified in domestic field 331 have no effect on international dialing. Additionally, restrictions specified in the international field 332 have no effect on domestic dialing.

Domestic dialing sequence lists in domestic field 331, are specified as any combination of NPA, NPA-NXX and NPA-NXX-XXXX. International dialing sequence lists, in international field 332, are specified as any combination of one-digit CCITT world zones and three-digit CCITT country codes.

As previously noted, each dialing field, whether domestic or international, may also have a customer specified polarity bit, respectively, 333 and 334. This dialing field polarity bit specifies that either the associated dialing sequences may be used or the associated dialing sequences may not be used when placing calls. If the dialing sequences in a first level may be used, the restriction list is called "inclusive". If the dialing sequences in a first level may not be used, the restriction list is called "exclusive". As noted, each list of dialing sequences may consist of up to three levels. The level of a dialing sequence within a list of dialing sequences is determined by the digits the sequence has in common with other sequences. A first level dialing sequence has either none or all digits in common with other dialing se-

quences. A second level dialing sequence has leading, but not all, digits in common with one first level dialing sequence. A third level dialing sequence has leading, but not all, digits in common with one first and one second level dialing sequence.

First level sequences define the rules for determining which dialing sequences may be used. Second level sequences define exceptions to the rules defined by first level sequences. Third level sequences define exceptions to the rules defined by first and second level sequences.

For inclusive lists, the customer may use any first level dialing sequence. The second level defines dialing sequences, within those allowed by the first level, that may not be dialed. The third level defines dialing sequences, within those disallowed by the second level, that may be dialed.

For exclusive lists, the customer may use any dialing sequence not identified by a first level dialing sequence. The second level defines dialing sequences, within those disallowed by the first level, that may be dialed. The third level defines dialing sequences, within those allowed by the second level, that may not be dialed.

Returning to our example, we assume the domestic polarity bit 333 is set, and hence the domestic field 331 is exclusive. Thus, in step 213 the first level list of domestic field 331 is exclusive. Consequently, calls to each NPA, NPA-NXX, and NPA-NXX-XXXX listed in the first level are prohibited. Since, in our example, the called number (i.e., 212-221-0105) has an NPA that is found in the first level list, i.e. 212, the call, as well as all other calls to area code 212, is geographically restricted at the first level. However, at the second level (which lists exceptions to the first level restrictions) calls to NPA number 212 and NXX number 221 are not geographically restricted. Thus, our example call to 212-221-0105 is not restricted, since it is an exception to the first level restriction. Similarly, calls to other NPA-NXX and NPA-NXX-XXXX listed in the second level are exceptions to the first level restrictions.

However, the third level must also be checked to determine if any exception exists to the second level permission granted. In our example, since the last four digits (or line number-0105) of the called party number are not found in the third level list, the call to 212-221-0105 is not geographically restricted.

Note, if the call had been placed to 212-221-0106 (station set 106) rather than 212-221-0105 the call would have been rejected at the third level of table 320. Similarly, calls to the other telephone numbers listed in the third level are prohibited.

If the domestic polarity bit was not set then the domestic field 331 is inclusive. Thus, the first level list would be inclusive, the second level list would be exceptions to the first level list permissions and the third level list would be permitted called numbers. Consequently, if the domestic polarity bit was not set, then in

step 212 our example call to 212-221-0105 would have been restricted.

Note, if the call had been an international call, a procedure similar to the above-described domestic procedure would follow. Thus, the international polarity bit 334 is checked to determine if the international field 332 is inclusive or exclusive. The called international number would then be checked against the first and second levels to determine if the call should be permitted or denied.

Returning to our domestic call example, with the domestic polarity bit set, call processing continues as follows. Since, in our example the called number is not restricted in step 214, the CAS/NCP 110 proceeds with call processing and determines in step 215 if any calling station type restrictions apply to the call.

In step 215, OSPS 113 checks table 340 to determine whether the calling station 103 is the type of station from which calls are restricted, i.e., calls from a pay phone which utilizes a particular type of alternative operator service. This feature is called terminating code screening. If the calling station 103 was of the restricted type, its number would be listed in table 340 (e.g., 312-366-4577) and a call denial message generated in step 217. Then, in step 218 an appropriate announcement would be played to the calling party. Since calling station 103 is not of the restricted type, CAS/NCP 110 proceeds, in step 216, to determine whether a fraud condition exists.

The GR table 320 includes a fraud indicator bit 325 which indicates whether credit card calling fraud has previously been detected for this credit card number and PIN. In step 216, CAS/NCP 110 detects if the fraud indicator bit is set. If the fraud bit is set, the call is denied and CAS/NCP 110 generates the call denied message which is sent to OSPS 113 in step 217. If the bit is not set, normal call processing proceeds in step 219.

In step 219, CAS/NCP 110 generates a call permit message which is sent to OSPS 113. OSPS 113 records the customer billing information, in a well-known manner, using an automated message accounting (AMA) system and the call connection is completed between the calling and called stations.

Another type of fraud detection is performed in step 220 at CAS/NCP 110 and involves a threshold based on the number of credit card number billing attempts in a given period of time. Thus, notwithstanding the fact that a correct credit card number and PIN code are entered, a fraud condition may exist. Such a condition may exist, for example, when the credit card number and the PIN code have been misappropriated by the user. Under those circumstances, when the fraud threshold is exceeded in step 220 the CAS/NCP 110 sends the credit card number and information specifying which threshold was exceeded to the CAS/OSS 111 (step 221). Also in step 221, the CAS/OSS 111 checks the number of call attempts against a credit card usage profile.

In step 222, CAS/OSS 111 determines whether the credit card usage is suspected of fraud. If no fraud is

suspected, no further action is taken. However, in step 222, if CAS/OSS 111 determines that fraud is suspected, the record is sent, in step 223, to the Card Threshold Investigation Center (CTIC) for further handling. The CTIC makes a final determination, in step 224, as to whether a credit card fraud condition exists. If no fraud condition exists, the inquiry is terminated. If a fraud condition exists, then, in step 225, CAS/OSS 111 sends an update message to CAS/NCP 110 to set a fraud indicator bit 325 of GR table 320. The fraud indicator bit 325 prevents subsequent calls from being charged to credit card number 321 and PIN 322.

The processing of a CAS type call assisted by an operator proceeds in the same manner as the above-described automated call. Thus, in step 203, the operator would collect the credit card number and PIN. If CAS/NCP 110 issues a denial message, the operator, in step 218, would inform the calling party that the card is invalid and would ask for alternative means for billing the call.

While the present invention has been described as restricting telephone calls, it should be understood that it may also be applied to restrict data, facsimile, video or other communication calls.

Claims

1. A method of processing a communication call by reading data provided by a transmitting station through communication lines, determining validation using data stored at a remote data base, comparing a portion of the read data with the data and controlling a call connection from the comparing results, the method characterized by the steps of

receiving the call including a call billing request (201) and a call dialing sequence from a caller (103) over a public switched network, acknowledging the receipt of said billing request to the caller (202), subsequently receiving a call billing code from the caller (203), validating said billing code (208, 209) at a charge validation location (110), for a validated billing code, accessing a centralized data base connected to the charge validation location (210-216) using said billing code to obtain stored dialing data which identifies potential call destinations for said call, and comparing the received dialing sequence with the stored dialing data (210-216, 219) and, in response thereto, signaling said switched network to control a call connection to the destination determined by said dialing sequence.

2. The method of claim 1 characterized in that said comparing step signals (214) said switched network

- to deny the completion of the call connection to the destination.
3. The method of claim 1 characterized in that said comparing step signals (219) said switched network to complete the call connection to the destination.
 4. The method of claim 1 characterized in that said accessing step accesses a polarity bit (211) associated with said billing code, said polarity bit having a first value indicating that said stored dialing data includes permissible call destinations and a second value indicating that said stored data includes impermissible call destinations; and in that said comparing step is jointly responsive to said stored dialing data and the value of said polarity bit for signaling said switched network to control the call connection to the destination.
 5. The method of claim 1 characterized in that said accessing step accesses stored dialing data (320) identifying a plurality of permissible destinations for said call.
 6. The method of claim 1 characterized in that said accessing step accesses stored dialing data (320) identifying a plurality of impermissible destinations for said call.
 7. The method of claim 1 characterized in that said accessing step accesses a fraud indicator associated with said billing code, said method further comprising the step of detecting (216) the status of said fraud indicator (325) and, in response thereto, signaling said switched network to control the call connection to said destination determined by said dialing sequence.
 8. The method of claim 1 characterized in that said received call message includes a calling station identification, and said method further comprising the step of determining if a calling station is a restricted station (340) by checking said calling station identification against previously stored calling station identifications and, in response to said determination, signaling said switched network to control the call connection to said destination determined by said dialing sequence.
 9. The method of claim 1 characterized in that said accessing step accesses two lists of dialing sequences (331) including

a first list where each dialing sequence thereon has no NPA or NXX codes in common with any other dialing sequence in said first list, and

a second list where each dialing sequence thereon has an NPA code in common with a dialing sequence of said first list.

10. The method of claim 9 characterized in that said accessing step accesses a third list of dialing sequences where each third list dialing sequence has both NPA and NXX codes in common with a dialing sequence of said second list.
11. The method of claim 1 characterized in that said accessing step accesses a domestic list (331) and an international list (332) of dialing sequences for at least one billing code.
12. The method of claim 1 characterized in that said billing code (321) is a non-telephone-number-based charge card number.
13. Apparatus for processing a communication call by reading data provided by a transmitting station through communication lines, determining validation using data stored at a remote data base, comparing a portion of the read data with the data and controlling a call connection from the comparing results, said apparatus characterized by

means for receiving a call including a call billing request (201) and a call dialing sequence from a caller (103) over a public switched network, means for acknowledging the receipt of said billing request to the caller (202), means for subsequently receiving a call billing code from the caller (203), means for validating said billing code (208, 209) at a charge validation location (110), processor means, responsive to a validated billing code, for 1) accessing a centralized data base connected to the charge validation location (210-216) using said billing code to obtain stored dialing data which identifies potential call destinations for said call, 2) thereafter comparing the receiving dialing sequence with the stored dialing data (210-216, 219) and, in response thereto, 3) signaling said switched network to control a call connection to the destination determined by said dialing sequence.
14. The apparatus of claim 13 characterized in that said apparatus includes a polarity bit associated with said billing code, said polarity bit having a first value indicating that said stored dialing data includes permissible call destinations and a second value indicating that said stored dialing data includes impermissible call destinations; and in that said processor means is jointly responsive to said stored dialing data and the value of said polarity bit for signaling said switched network to control

the call connection to said destination.

15. The apparatus of claim 13 characterized in that said data base includes previously stored billing code data and said processor means includes means for checking said received call billing code against said stored billing code data and, in response thereto, for signaling said switched network to control the call connection to the destination determined by said dialing sequence. 5 10
16. The apparatus of claim 13 characterized in that said data base includes a fraud indicator associated with said billing code, and said processor means includes means for detecting the status of said fraud indicator and, in response thereto, for signaling said switched network to control the call connection to said destination determined by said dialing sequence. 15 20
17. The apparatus of claim 13 characterized in that said received call message includes a calling station identification, and said processor means includes means for determining if a calling station is a restricted station by checking said calling station identification against previously stored calling station identifications and, in response to said determination, for signaling said switched network to control the call connection to the destination determined by said dialing sequence. 25 30
18. The apparatus of claim 13 characterized in that said data base comprises two lists of dialing sequences including 35
- a first list where each dialing sequence thereon has no NPA or NXX codes in common with any other dialing sequence in said first list, and a second list where each dialing sequence thereon has an NPA code in common with a dialing sequence of said first list. 40
19. The apparatus of claim 13 characterized in that said data base comprises a third list of dialing sequences where each third list dialing sequence has both NPA and NXX codes in common with a dialing sequence of said second list. 45 50

Patentansprüche

1. Verfahren zur Bearbeitung eines Kommunikationsanrufs durch Lesen von Daten, die von einer Sendestelle über Kommunikationsleitungen bereitgestellt werden, Bestimmen von Validierung unter Benutzung von in einer entfernten Datenbank gespeicherten Daten, Vergleich n ein s Teils der geles - 55

nen Daten mit den Daten und Steuern inner Anrufverbindung entsprechend den Vergleichsergebnissen, gekennzeichnet durch folgende Schritte:

Empfang n d s Anrufs einschli ßlich einer Rufgebührenberechnungsanforderung (201) und einer Verbindungswählfolge von einem Anrufer (103) über ein öffentliches Wählnetz, Bestätigen des Empfangs der besagten Gebührenberechnungsanforderung für den Anrufer (202), nachfolgendes Empfangen eines Anrufgebührenberechnungscode vom Anrufer (203), Validieren des besagten Gebührenberechnungscode (208, 209) an einer Gebührenvalidierungsstelle (110), bei einem validierten Gebührenberechnungscode Zugreifen auf eine mit der Gebührenvalidierungsstelle (210-216) verbundene zentrale Datenbank unter Benutzung des besagten Gebührenberechnungscode zum Erhalten von gespeicherten Wähldaten, die mögliche Anrufziele für den besagten Anruf kennzeichnen, und Vergleichen der empfangenen Wählfolge mit den gespeicherten Wähldaten (210-216, 219) und als Reaktion darauf Zeichengabe zum besagten Wählnetz zur Steuerung einer Rufverbindung zu dem durch besagte Wählfolge bestimmten Ziel.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der besagte Vergleichsschritt dem besagten Wählnetz signalisiert (214), die Herstellung der Rufverbindung zum Ziel zu verweigern.
3. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der besagte Vergleichsschritt dem besagten Wählnetz signalisiert (219), die Rufverbindung zum Ziel herzustellen.
4. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der besagte Zugriffsschritt auf ein mit dem besagten Gebührenberechnungscode verbundenes Polaritätsbit (211) zugreift, wobei das besagte Polaritätsbit einen ersten Wert aufweist, der anzeigt, daß die besagten gespeicherten Wähldaten zulässige Rufziele enthalten, und einen zweiten Wert, der anzeigt, daß die besagten gespeicherten Daten unzulässige Rufziele enthalten; und daß der besagte Vergleichsschritt sowohl auf die besagten gespeicherten Wähldaten als auch den Wert des besagten Polaritätsbits reagiert, um dem besagten Wählnetz zu signalisieren, die Rufverbindung zum Ziel zu steuern.
5. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der besagte Zugriffsschritt auf gespeicher-

- te Wähldaten (320) zugreift, die eine Mehrzahl zulässiger Ziele für den besagten Anruf kennzeichnen.
6. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der besagte Zugriffsschritt auf gespeicherte Wähldaten (320) zugreift, die eine Mehrzahl von unzulässigen Zielen für den besagten Anruf kennzeichnen.
7. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der besagte Zugriffsschritt auf eine mit dem besagten Gebührenberechnungscode verbundene Betrugsanzeige zugreift, wobei das besagte Verfahren weiterhin
- den Schritt des Erkennens (216) des Zustandes der besagten Betrugsanzeige (325) und als Reaktion darauf den Schritt der Zeichengabe zum besagten Wählnetz zur Steuerung der Rufverbindung zu dem durch die besagte Wählfolge bestimmten besagten Ziel umfaßt.
8. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß die besagte empfangene Anrufrnachricht eine Anruferstellenkennzeichnung enthält und daß das besagte Verfahren weiterhin folgende Schritte umfaßt:
- Bestimmen, ob eine Anruferstelle eine gesperrte Stelle (340) ist, durch Vergleichen der besagten Anruferstellenkennzeichnung mit vorgespeicherten Anruferstellenkennzeichnungen und als Reaktion auf die besagte Bestimmung, Zeichengabe zum besagten Wählnetz zur Steuerung der Anrufverbindung zum besagten durch besagte Wählfolge bestimmten Ziel.
9. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der besagte Zugriffsschritt auf zwei Listen von Wählfolgen (331) zugreift, einschließlich
- einer ersten Liste, bei der jede darin enthaltene Wählfolge keine mit irgendeiner anderen Wählfolge in der besagten ersten Liste gemeinsamen NPA- oder NXX-Codes aufweist, und einer zweiten Liste, wobei jede darin enthaltene Wählfolge einen mit einer Wählfolge in der besagten ersten Liste gemeinsamen NPA-Code aufweist.
10. Verfahren nach Anspruch 9, dadurch gekennzeichnet, daß der besagte Zugriffsschritt auf eine dritte Liste von Wählfolgen zugreift, wobei jede Wählfolge der dritten Liste mit einer Wählfolge der besagten zweiten Liste gemeinsame NPA- als auch NXX-Codes aufweist.
11. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der besagte Zugriffsschritt auf ein Inland-

liste (331) und eine Auslandsliste (332) von Wählfolgen für mindestens einen Gebührenberechnungscode zugreift.

12. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der besagte Gebührenberechnungscode (321) eine Kontokartenummer ist, die nicht auf einer Telefonnummer beruht.
13. Anordnung zur Bearbeitung eines Kommunikationsanrufes durch Lesen von durch eine Sendestelle über Kommunikationsleitungen bereitgestellten Daten, Bestimmen von Validierung unter Verwendung von in einer entfernten Datenbank gespeicherten Daten, Vergleichen eines Teils der gelesenen Daten mit den Daten und Steuern einer Anrufverbindung entsprechend den Vergleichsergebnissen, gekennzeichnet durch
- Mittel zum Empfangen eines Anrufs einschließlich einer Rufgebührenberechnungsanforderung (201) und einer Verbindungswählfolge von einem Anrufer (103) über ein öffentliches Wählnetz,
- Mittel zum Bestätigen des Empfangs der besagten Gebührenberechnungsanforderung für den Anrufer (202),
- Mittel zum nachfolgenden Empfangen eines Anrufgebührenberechnungs_codes vom Anrufer (203),
- Mittel zum Validieren des besagten Gebührenberechnungs_codes (208, 209) an einer Gebührenvalidierungsstelle (110),
- auf einen validierten Gebührenberechnungscode reagierende Prozessormittel zum 1) Zugreifen auf eine mit der Gebührenvalidierungsstelle (210-216) verbundene zentrale Datenbank unter Benutzung des besagten Gebührenberechnungs_codes zum Erhalten von gespeicherten Wähldaten, die mögliche Anrufziele für den besagten Anruf kennzeichnen, 2) nachfolgenden Vergleichen der Empfangswählfolge mit den gespeicherten Wähldaten (210-216, 219) und als Reaktion darauf 3) Zeichengabe zum besagten Wählnetz zur Steuerung einer Rufverbindung zu dem durch die besagte Wählfolge bestimmten Ziel.
14. Anordnung nach Anspruch 13, dadurch gekennzeichnet, daß die besagte Anordnung ein mit dem besagten Gebührenberechnungscode verbundenes Polaritätsbit enthält, das einen ersten Wert aufweist, der anzeigt, daß die besagten gespeicherten Wähldaten zulässige Anrufziele enthalten, und einen zweiten Wert, der anzeigt, daß die besagten gespeicherten Wähldaten unzulässige Anrufziele enthalten; und daß
- die besagten Prozessormittel sowohl auf die

besagten gespeicherten Wähl­daten als auch dem Wert des besagten Polaritätsbits reagieren, um dem besagten Wähl­netz zu signalisieren, die Ruf­verbindung zum besagten Ziel zu steuern.

15. Anordnung nach Anspruch 13, dadurch gekennzeichnet, daß die besagte Datenbank vorgese­richte Gebührenberechnungscodendaten enthält und die besagten Prozessor mittel Mittel zum Ver­gleichen des besagten empfangenen Rufgebüh­renberechnungscodes mit besagten gespeicherten Gebührenberechnungscodendaten und, als Reakti­on darauf, zur Zeichengabe zum besagten Wähl­netz zur Steuerung der Rufverbindung zu dem durch die besagte Wählfolge bestimmten Ziel ent­hält.
16. Anordnung nach Anspruch 13, dadurch gekenn­zeichnet, daß die besagte Datenbank eine mit dem besagten Gebührenberechnungscode verbundene Betrugsanzeige enthält und die besagten Prozes­ ORMittel Mittel zum Erkennen des Zustandes der besagten Betrugsanzeige und als Reaktion darauf zur Zeichengabe zum besagten Wähl­netz zur Steuerung der Rufverbindung zu dem durch besagte Wählfolge bestimmten besagten Ziel enthalten.
17. Anordnung nach Anspruch 13, dadurch gekenn­zeichnet, daß die besagte empfangene Anrufrach­richt eine Anruferstellenkennzeichnung enthält und besagte Prozessormittel Mittel zum Bestimmen, ob eine Anruferstelle eine gesperrte Stelle ist, durch Vergleichen der besagten Anruferstellenkenn­zeichnung mit vorg gespeicherten Anruferstellen­kennzeichnungen und als Reaktion auf die besagte Bestimmung zur Zeichengabe zum besagten Wähl­netz zur Steuerung der Rufverbindung zu dem durch besagte Wählfolge bestimmten Ziel enthal­ten.
18. Anordnung nach Anspruch 13, dadurch gekenn­zeichnet, daß die besagte Datenbank zwei Listen von Wählfolgen umfaßt, einschließlich
einer ersten Liste, wobei jede darin enthaltene Wählfolge keine mit irgendeiner anderen Wähl­folge in der besagten ersten Liste gemeinsame NPA- oder NXX-Codes aufweist, und
einer zweiten Liste, wobei jede darin enthaltene Wählfolge einen mit einer Wählfolge der besag­ten ersten Liste gemeinsamen NPA-Code auf­weist.
19. Anordnung nach Anspruch 13, dadurch gekenn­zeichnet, daß die besagte Datenbank eine dritte Li­ste von Wählfolgen umfaßt, wobei jede Wählfolge der dritten Liste mit einer Wählfolge der besagten zweiten Liste gemeinsame NPA- als auch NXX-Co-

des aufweist.

R revendication

1. Procédé de traitement d'une demande de commu­nication en lisant des données fournies par une sta­tion de transmission via des lignes de télécommu­nications, en déterminant la validation au moyen de données mémorisées dans une base de données distante, en comparant une partie des données lues avec les données et en commandant une con­nexion de communication à partir des résultats de comparaison, le procédé étant caractérisé par les étapes consistant
à recevoir la communication, y compris une re­quête de facturation de communication (201) et une séquence de numérotation de communi­cation provenant d'un demandeur (103) via un ré­seau commuté public,
accuser la réception de ladite requête de fac­turation au demandeur (202),
recevoir ensuite un indicatif de facturation de communication du demandeur (203),
valider ledit code de facturation (208, 209) en un lieu de validation de taxation (110),
pour un indicatif de facturation validé, accéder à une base de données centralisée connectée au lieu de validation de taxation (210-216) en utilisant ledit indicatif de facturation pour obte­nir des données de numérotation mémorisées qui identifient des destinations de communi­cation potentielles pour ladite communication, et comparer la séquence de numérotation reçue avec les données de numérotation mémori­sées (210-216, 219) et, en réaction à ceci, si­gnaler audit réseau commuté de commander une connexion de communication à la destina­tion déterminée par ladite séquence de numé­rotation.
2. Procédé suivant la revendication 1, caractérisé en ce que ladite étape de comparaison signale (214) audit réseau commuté de refuser l'établissement de la connexion de communication à la destination.
3. Procédé suivant la revendication 1, caractérisé en ce que ladite étape de comparaison signale (219) audit réseau commuté d'établir la connexion de communication vers la destination.
4. Procédé suivant la revendication 1, caractérisé en ce que ladite étape d'accès accède à un binaire de polarité (211) associé audit indicatif de facturation, ledit binaire de polarité ayant un première valeur indiquant que lesdites données de numérotation mémorisées comprennent des destinations d

communication admissibles et une deuxième valeur indiquant que lesdites données mémorisées comprennent des destinations de communication inadmissibles; et en ce que

ladite étape de comparaison réagit conjointement auxdites données de numérotation mémorisées et à la valeur dudit binaire de polarité pour signaler audit réseau commuté de commander la connexion de communication à la destination.

5. Procédé suivant la revendication 1, caractérisé en ce que ladite étape d'accèsion accède à des données de numérotation mémorisées (320) identifiant une pluralité de destinations admissibles pour ladite communication.

6. Procédé suivant la revendication 1, caractérisé en ce que ladite étape d'accèsion accède à des données de numérotation mémorisées (320) identifiant une pluralité de destinations inadmissibles pour ladite communication.

7. Procédé suivant la revendication 1, caractérisé en ce que ladite étape d'accèsion accède à un indicateur de fraude associé audit indicatif de facturation, ledit procédé comprenant en outre l'étape consistant à détecter (216) l'état dudit indicateur de fraude (325) et, en réaction à ceci, signaler audit réseau commuté de commander la connexion de communication à ladite destination déterminée par ladite séquence de numérotation.

8. Procédé suivant la revendication 1, caractérisé en ce que ledit message de communication reçu comprend une identification du poste demandeur, et ledit procédé comprend en outre l'étape consistant à déterminer si un poste demandeur est un poste restreint (340) en vérifiant ladite identification de poste demandeur par rapport à des identifications de poste demandeur précédemment mémorisées et, en réaction à ladite détermination, signaler audit réseau commuté de commander la connexion de communication à ladite destination déterminée par ladite séquence de numérotation.

9. Procédé suivant la revendication 1, caractérisé en ce que ladite étape d'accèsion accède à deux listes de séquences de numérotation (331) comprenant

une première liste sur laquelle chaque séquence de numérotation ne présente aucun indicatif régional ou de central en commun avec une autre séquence de numérotation quelconque dans ladite première liste, et une deuxième liste sur laquelle chaque séquence de numérotation présente un indicatif

régional en commun avec une séquence de numérotation de ladite première liste.

10. Procédé suivant la revendication 9, caractérisé en ce que ladite étape d'accèsion accède à une troisième liste de séquences de numérotation où chaque séquence de numérotation de troisième liste a des indicatifs régionaux et de central en commun avec une séquence de numérotation de ladite deuxième liste.

11. Procédé suivant la revendication 1, caractérisé en ce que ladite étape d'accèsion accède à une liste nationale (331) et à une liste internationale (332) de séquences de numérotation pour au moins un indicatif de facturation.

12. Procédé suivant la revendication 1, caractérisé en ce que ledit indicatif de facturation (321) est un numéro de carte de taxation qui n'est pas basé sur un numéro d'appel.

13. Appareil destiné à traiter une demande de communication en lisant des données fournies par une station de transmission via des lignes de télécommunications, en déterminant la validation de données mémorisées dans une base de données distante, en comparant une partie des données lues avec les données et en commandant une connexion de communication à partir des résultats de comparaison, ledit appareil étant caractérisé par

des moyens destinés à recevoir une communication, y compris une requête de facturation de communication (201) et une séquence de numérotation de communication, provenant d'un demandeur (103) via un réseau commuté public,

des moyens destinés à accuser la réception de ladite requête de facturation au demandeur (202),

des moyens destinés à recevoir ensuite un indicatif de facturation de communication du demandeur (203),

des moyens destinés à valider ledit indicatif de facturation (208, 209) en un lieu de validation de taxation (110),

un moyen processeur, réagissant à un indicatif de facturation validé, afin de 1) accéder à une base de données centralisée connectée au lieu de validation de taxation (210-216) en utilisant ledit indicatif de facturation pour obtenir des données de numérotation mémorisées qui identifient des destinations de communication potentielles pour ladite communication, 2) comparer ensuite la séquence de numérotation reçue avec les données de numérotation mémorisées (210-216, 219) et, en réaction à ceci, 3)

signaler audit réseau commuté de commander une connexion de communication à la destination déterminée par ladite séquence de numérotation.

14. Appareil suivant la revendication 13, caractérisé en ce que ledit appareil comprend un binaire de polarité associé audit indicatif de facturation, ledit binaire de polarité ayant une première valeur indiquant que lesdites données de numérotation mémorisées comprennent des destinations de communication admissibles et une deuxième valeur indiquant que lesdites données de numérotation mémorisées comprennent des destinations de communication inadmissibles; et que
 ledit moyen processeur réagit à la fois auxdites données de numérotation mémorisées et à la valeur dudit binaire de polarité pour signaler audit réseau commuté de commander la connexion de communication à ladite destination.
15. Appareil suivant la revendication 13, caractérisé en ce que ladite base de données comprend des données d'indicatif de facturation précédemment mémorisées et que ledit moyen processeur comprend des moyens destinés à vérifier ledit indicatif de facturation de communication reçu par rapport auxdites données d'indicatif de facturation mémorisées et, en réaction à ceci, à signaler audit réseau commuté de commander la connexion de communication à la destination déterminée par ladite séquence de numérotation.
16. Appareil suivant la revendication 13, caractérisé en ce que ladite base de données comprend un indicateur de fraude associé audit indicatif de facturation, et que ledit moyen processeur comprend des moyens destinés à détecter l'état dudit indicateur de fraude et, en réaction à ceci, à signaler audit réseau commuté de commander la connexion de communication à ladite destination déterminée par ladite séquence de numérotation.
17. Appareil suivant la revendication 13, caractérisé en ce que ledit message de communication reçu comprend une identification de poste de demandeur, et ledit moyen processeur comprend des moyens destinés à déterminer si un poste demandeur est un poste restreint en vérifiant ladite identification de poste demandeur par rapport à des identifications de poste demandeur précédemment mémorisées et, en réaction à ladite détermination, signaler audit réseau commuté de commander la connexion de communication à la destination déterminée par ladite séquence de numérotation.
18. Appareil suivant la revendication 13, caractérisé en ce que ladite base de données comprend deux lis-

tes de séquences de numérotation comprenant

une première liste sur laquelle chaque séquence de numérotation ne présente aucun indicatif régional ou de central en commun avec une autre séquence de numérotation quelconque dans ladite première liste, et
 une deuxième liste sur laquelle chaque séquence de numérotation présente un indicatif régional en commun avec une séquence de numérotation de ladite première liste.

19. Appareil suivant la revendication 13, caractérisé en ce que ladite base de données comprend une troisième liste de séquences de numérotation où chaque séquence de numérotation de troisième liste présente des indicatifs régionaux et de central en commun avec une séquence de numérotation de ladite deuxième liste.

FIG. 1

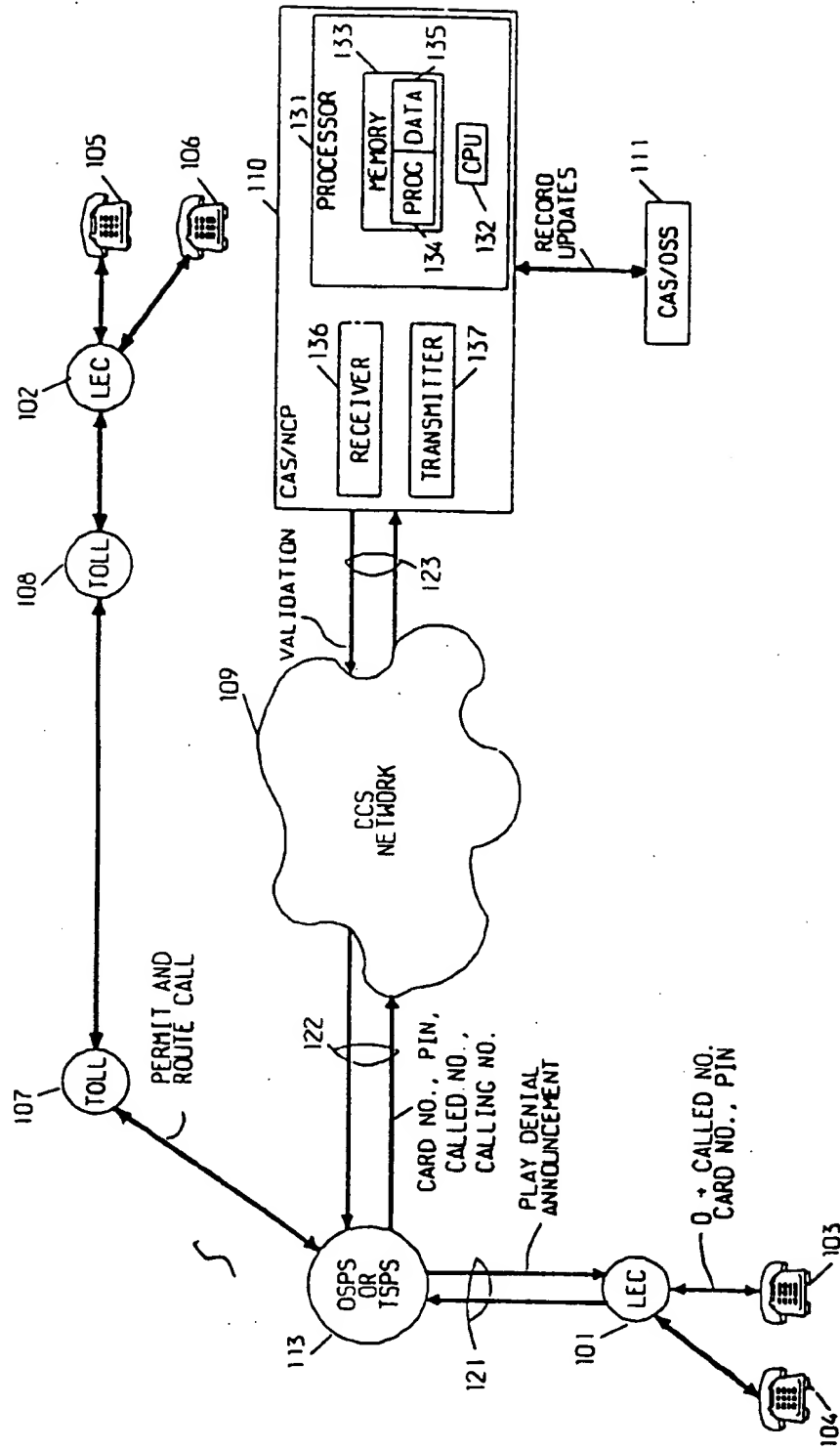


FIG. 2

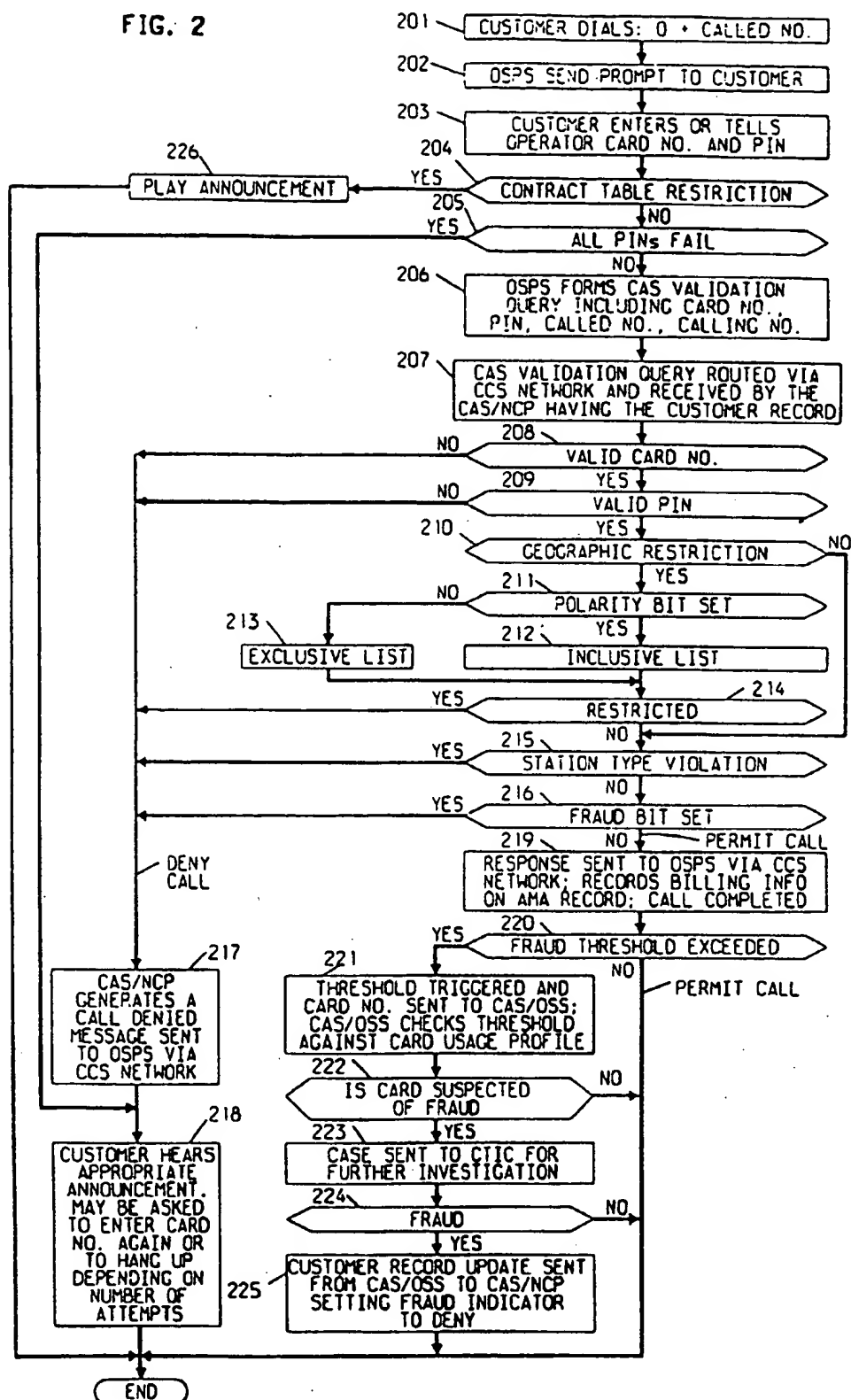


FIG. 3

GEOGRAPHIC
RESTRICTION
TABLE
320

321 CARD NO.	322 PIN	323 DOM. GR BIT	324 INT. GR BIT	325 FRAUD BIT
DOMESTIC		POLARITY BIT	333	
		<u>1ST LEVEL</u>	<u>2ND LEVEL</u>	<u>3RD LEVEL</u>
		201		
		212-	212-221	212-221-0106
		609-843-6655		
		312	312-843	
			312-953	
		401	401-843-6655	
		718-843	718-843-6655	
		516	516-843	516-843-6655
			516-953	516-953-6655
				516-953-4081
INTERNATIONAL		POLARITY BIT	334	
		<u>1ST LEVEL</u>	<u>2ND LEVEL</u>	
		7		
		34		
		501		
		6	61	
			62	
		2	220	

CONTRACT TABLE 310

311	NPA-NXX
	312-365
	⋮

INVALID
CALLING STATION
TABLE 340

312-366-4577
